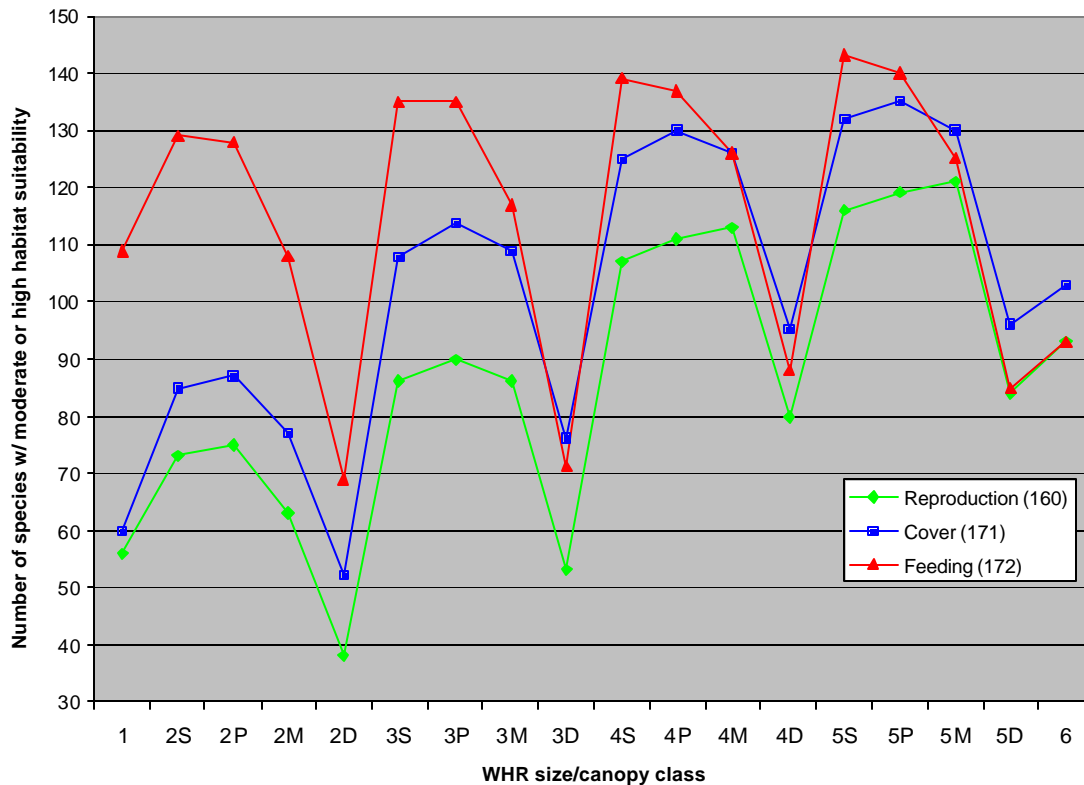# Sensitivity of WHR Habitat Model
for Sierra Mixed Conifer Forests
in Shasta County

The DFG's California Wildlife Habitat Relationships System (WHR) was created as a tool for wildlife biologists and natural resource managers to model the effects of habitat change on wildlife species. The graph above illustrates a general trend between tree size, canopy closure and habitat suitability for the interior coniferous forests of northern California. For example, 120 species find medium or high quality reproductive habitat in sierran mixed coinfer (SMC) 5M, whereas only 39 species find similar quality habitat in SMC 2D. The model predicts that the number of wildlife species finding good reproductive and cover habitat increases as trees in the forest get bigger, but decreases if the canopy becomes too dense. The model also predicts that the number of wildlife species finding good foraging habitat increases as the forest becomes more open. For more information on WHR, go to the DFG's main website for the program at http://www.dfg.ca.gov/whdab/html/cwhr.html

The WHR size/canopy classes are defined as follows:

Size Class	Definition	Canopy Class	Definition
1	QMD < 1"	S	10 - 25%
2	QMD = 1 - 6"	P	25 - 40%
3	QMD = 6 - 11"	M	40 - 60%
4	QMD = 11 - 24"	D	> 60%
5	QMD > 24"		
6	Multi-layered: Size Classes 5 over 4 or 3; Canopy Class D		

Notes: QMD is the quadratic mean diameter at breast height of a forest stand. The numbers in parentheses in the graph above denote the total number of species finding either moderate or high habitat suitability (e.g., reproduction, cover, feeding) in at least one of the size/canopy classes. In other words, this is the total number of species that find good habitat in some part of the forest.

Wildlife Species Found in Different Seral Stages
of Shasta County Sierra Mixed Conifer Forest
(Based on WHR habitat model predictions)

The two tables below feature species that may rely on a particular forest seral stage for all or part of their habitat needs. The WHR model was used to predict which species would occur (with medium or high suitability) in three different groups of WHR habitats. These groups were chosen to reflect forest habitats common on the timbered landscape. Only those species unique to one of the three groups has been listed. The results show distinct subsets of species that are closely tied to the early and late ends of the successional continuum.

WHR Habitat Group	# Unique (# total)	Unique Species (Not in other two habitat groups) Medium or High *Feeding* Habitat Suitability	
		Common Names of Unique Species	
SMC 1 (Early seral)	28 (*109*)	**American badger**	**Lincoln's sparrow**
		American robin	Long eared owl
		Black-tailed jackrabbit	Merlin
		Botta's pocket gopher	Mountain bluebird
		Brewer's blackbird	**Mountain pocket gopher**
		Brown headed cowbird	Prairie falcon
		Brush mouse	**Racer**
		Brush rabbit	**Sagebrush lizard**
		California ground squirrel	**Song sparrow**
		California vole	**Sonoma chipmunk**
		Calliope hummingbird	Spotted towhee
		Coyote	**Western pocket gopher**
		Grey fox	**Western skink**
		Green tailed towhee	**Yellow bellied marmot**
SMC 2D or SMC 3D (Early to mid-seral)	0 (*84*)		
SMC 4M or SMC 5M (Mid to late seral)	22 (*133*)	**American martin**	**Purple finch**
		Barred owl	**Red crossbill**
		Black headed grosbeak	**Shasta salamander**
		Douglas' squirrel	**Shrew mole**
		Downy woodpecker	**Spotted owl**
		Fisher	**Warbling vireo**
		Hammond's flycatcher	**Water shrew**
		Lodgepole chipmunk	**Western gray squirrel**
		Macgillivray's warbler	Western toad
		Osprey	**White headed woodpecker**
		Pileated woodpecker	**Williamson's sapsucker**

	Non-Unique Species		Total Species
	In 2 out of 3 habitat groups	In 3 out of 3 habitat groups	For all habitat groups
# of Species:	74	43	167

Notes:
Bold font denotes species with medium or high suitability for both reproductive and feeding habitat.
SMC denotes Sierran Mixed Conifer in Shasta county.

WHR Habitat Group	# Unique (# total)	Unique Species (Not in other two habitat groups) Medium or High *Reproductive* Habitat Suitability	
		Common Names of Unique Species	
SMC 1 (Early seral)	18 (*56*)	**American badger**	**Lincoln's sparrow**
		Barn owl	**Mountain pocket gopher**
		Black-tailed jackrabbit	**Racer**
		Botta's pocket gopher	**Sagebrush lizard**
		Brush mouse	**Song sparrow**
		California ground squirrel	**Sonoma chipmunk**
		California vole	**Western pocket gopher**
		Common nighthawk	**Western skink**
		Green tailed towhee	**Yellow bellied marmot**
SMC 2D or SMC 3D (Early to mid-seral)	2 (*63*)	Grey fox	Western spotted skunk
SMC 4M or SMC 5M (Mid to late seral)	55 (*129*)	American kestrel	Nashville warbler
		American martin	Northern flicker
		American robin	Northern goshawk
		Band tailed pigeon	Northern pygmy owl
		Barred owl	Northern saw-whet owl
		Black headed grosbeak	**Pileated woodpecker**
		Blue grouse	Pine siskin
		Brown creeper	**Purple finch**
		Brown headed cowbird	Purple martin
		California quail	Pygmy nuthatch
		Cassin's vireo	Raccoon
		Chipping's sparrow	**Red crossbill**
		Douglas' squirrel	Red breasted sapsucker
		Ermine	Ruby crowned kinglet
		Evening grosbeak	Ruffed grouse
		Fisher	**Shasta salamander**
		Flammulated owl	**Shrew mole**
		Gray jay	**Spotted owl**
		Great blue heron	Townsend's solitaire
		Great horned owl	Violet green swallow
		Hairy woodpecker	**Warbling vireo**
		Hammond's flycatcher	**Water shrew**
		Lewis' woodpecker	**Western gray squirrel**
		Lodgepole chipmunk	White breasted nuthatch
		Macgillivray's warbler	**White headed woodpecker**
		Mountain chickadee	**Williamson's sapsucker**
		Mourning dove	Yellow warbler
		Mule deer	

	Non-Unique Species		Total Species
	In 2 out of 3 habitat groups	In 3 out of 3 habitat groups	For all habitat groups
# of Species:	54	21	150

Notes:
Bold font denotes species with medium or high suitability for both reproductive and feeding habitat.
SMC denotes Sierran Mixed Conifer in Shasta county.